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10/052,921	11/09/2001	Chunzeng Li	528.001	1030

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EXAMINER

OLSEN, KAJ K

ART UNIT	PAPER NUMBER
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1753

DATE MAILED: 03/24/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/052,921

Applicant(s)

LI ET AL.

Examiner

Kaj K Olsen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 December 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 26-42 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 26-42 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Priority

1. The examiner previously objected to the applicant's claim for priority (see previous office action). In applicant's remarks of 12-30-2004, applicant indicates a new declaration was submitted. However, the examiner cannot find this new declaration in the applicant's submitted papers and the previous objection is being maintained. Regardless of whether the applicant actually provided this new declaration (and the Office mishandled it) or not, please submit or resubmit this corrected declaration in any future communication.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 26-36 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

4. Claim 26 has been amended to specify that the tip is disposed at the electrical double layer. Presumably this amendment was in response to the examiner's position that the sample and prolar solution (and any electrical double layer formed by the combination of the sample and probe solution) constitute the intended use of the device. Applicant is attempting to claim that the tip is now at the electrical double layer to thereby obviate the intended use argument. However, the sample and polar solution are still part of the intended use of the device. Applicant does not appear to have challenged the examiner's assertion that these elements are not part of

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the claimed invention. Furthermore, the presence of an electrical double layer is entirely dependent on this unclaimed sample and polar solution. Hence, applicant is essentially attempting to define the apparatus based on what sample and solution one *might* place in the sample support. One possessing ordinary skill in the art would not be able to ascertain the metes and bounds of the claimed invention because it is based in part on the unclaimed properties of the intended use.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 26, 27 and 29-36 are rejected under 35 U.S.C. 102(b) as being anticipated by Horrocks et al (J. Chem. Faraday Trans., 1998, 94(8), pp. 1115-1118).

7. Horrocks discloses a scanning electrochemical potential microscope that comprises a sample support (a gold microdisc) that accommodates a sample of urease in a polar solution of water. Horrocks discloses a probe having a tip including a distal end disposed a perpendicular distance from the surface and a potential measuring device electrically coupled to the tip that measures a potential. See fig. 1 and Introduction. With respect to the formation of a potential gradient, it is only necessary for the structure of Horrocks to be capable of supporting a potential gradient, which the structure of Horrocks would clearly be capable of doing. In addition, it

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appears that fig. 2 and 3 evidence that a potential gradient has been established between the sample and the tip.

8. With respect to the new limitation requiring the tip being a distance from the surface at the electrical double layer, because the electrical double layer is part of the intended use of the device, it is entirely unclear what distance this corresponds to and whether this distance can be properly claimed as such. See 112 rejection above and the examiner's response to arguments below. Absent a clear structural distinction what this distance would be, the examiner will presume that Horrocks still anticipates the claimed device (however, see alternative rejection below).

9. With respect to the scanning actuator, fig. 3 demonstrates the presence of control of the relative movement between probe and sample, which would read on "scanning actuator" and "Z-actuator" giving the claim language its broadest reasonable interpretation.

10. With respect to the structure drawn to the use of feedback and tuning, see the discussion of the bi-potentiostat on p. 1116. Whether or not the bi-potentiostat is utilized for the specified tuning or feedback functions is the intended use of the bi-potentiostat and the intended use need not be given further due consideration in determining patentability.

11. With respect to how the Z-actuator translates Z-position of the tip, that is only the intended use of the apparatus and the intended use need not be given further due consideration in determining patentability.

12. With respect to new claim 36, because the polar solution is not being claimed, utilizing a solution with a selected ion concentration constitutes the intended use of the device.

Furthermore, Horrocks utilizes a particular choice of buffer and concentration of buffer (see

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captions for fig. 2-4) and would thereby meet this claim even if the polar solution were part of the claimed invention.

Claim Rejections - 35 USC § 103

13. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

14. Claims 26, 27 and 29-36 are rejected in the alternative under 35 U.S.C. 103(a) as being unpatentable over Horrocks in view of the applicant's admitted prior art. This alternative rejection was necessitated by the applicant's amendment to claim 26 specifying that the tip is located "at the electrical double layer".

15. These claims were rejected in the previous office action as being anticipated by Horrocks. Earlier in this office action, the examiner asserted that it is unclear how to interpret this new limitation because it is based on an unclaimed feature of the invention. See the 112 second paragraph rejection above and tentatively maintained the previous anticipatory rejection over Horrocks. However, even if the examiner gives this specified location of the tip patentable weight and the examiner presumed that the distances relied on by Horrocks would not meet this limitation, those distances would still have been obvious in view of the applicant's admitted prior art. In particular, applicant urged that the instant invention relies on tip-sample spacings of 8-15 nanometers. See p. 18, lines 14-24. Earlier in the background to the invention, applicant urged that conventional SECM (i.e. the technique of Horrocks) can take measurements with tip-sample

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spacings as little as 1 nm. See page 4, lines 3-5. Hence, conventional Z-actuating means for SECM permitted spacings on the order of a nanometer. It would have been obvious to one of ordinary skill in the art at the time the invention was being made to utilize conventional actuators that would permit spacings meeting the claim language for the microscope of Horrocks because the substitution of one known actuator for another known actuator requires only routine skill in the art. Moreover, any actuator that provides positional control down to 1 nm would clearly provide very accurate control of the position at larger distances as well. It should be noted that the examiner is not urging that it would have been obvious to one of ordinary skill in the art for Horrocks to perform its measurements at tip-sample spacings of around 1 nm. Rather the rejection is based on the fact that it would have been obvious to one of ordinary skill in the art for Horrocks to rely on conventional actuators in the art that would have provided distances that meet this claim interpretation.

16. Claims 28 and 37-42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Horrocks (or Horrocks in view of the admitted prior art) in view of Kwak et al (USP 5,202,004).

17. With respect to claim 28, Horrocks (or Horrocks in view of admitted prior art) set forth all the limitations of the claim, but did not explicitly recite the presence of a piezoelectric actuator. Kwak discloses in an alternate scanning electrochemical microscope the use of a piezoelectric actuator for the control of the z-directions. The piezoelectric element allows for angstrom level control of motion. See col. 2, line 59 through col. 3, line 15. It would have been obvious to one of ordinary skill in the art at the time the invention was being made to utilize the teaching of Kwak for the microscope of Horrocks (with or without the further teaching of the admitted prior art) in order to provide angstrom level control of the scanning tip motion.

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18. With respect to claim 37 (those limitations not covered previously), Horrock set forth all the limitations of the claim, but did not explicitly recite the presence of a feedback circuit to control tip-sample separation in response to a change in potential. However, it is conventional in the SECM art to utilize feedback control of the tip-sample separation. In particular, Kwak teaches a number of modes for operating a SECM including a mode where the measured signal is relied on to control the tip-sample separation such that the contours of the sample surface can be monitored and followed. See col. 6, lines 9-54. It would have been obvious to one of ordinary skill in the art at the time the invention was being made to utilize the teaching of Kwak for the microscope of Horrocks so that the tip-sample separation can be accurately controlled.

19. With to claims 38-40 and 42, see the previous discussion of Horrocks (both in this office action and the previous office action).

20. With respect to claim 41, modifying ionic concentration is only the intended use of the apparatus and the intended use need not be given further due consideration in determining patentability.

Response to Arguments

21. Applicant's arguments filed 12-30-2004 have been fully considered but they are not persuasive. Applicant urges that Horrocks is drawn to the use of relatively large tips that operate in the diffusion layer rather than the electrical double layer. However, the distinction between the tip of Horrocks and the tip of the instant invention has not been claimed. With respect to the issue of where the measurement of Horrocks is performed versus that of the instant invention, the examiner will further clarify his position concerning the issue of the electrical double layer and

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the intended use. First, the examiner reminds the applicant does not appear to be claiming a sample or a polar solution. All applicant has claimed is a sample support that can *accommodate* a sample in a polar solution. Whether an electrical double layer is even present or whether the tip is present “at the electrical double layer” depends on what unclaimed sample and solution are being placed on the sample support. If a non-electrical sample were placed on the sample support and/or a non-conductive, non-polar solution were utilized as the sample and/or solution, then presumably there would not be any electrical double layer. Hence, applicant appears to want the apparatus claims to be interpreted based on the presence of a feature (i.e. an electrical double layer) that entirely depends on the choice of unclaimed sample and solution. See the 112 rejection above. Furthermore, the feature in question might not even exist with some choices of sample and solution (as discussed above). Apparatus claims should be based on what the device is and not what the device does.

22. Applicant urges that measuring a potential gradient at the electrical double layer is not merely a statement of intended use. The examiner disagrees. Measuring a potential gradient at the electrical double layer is what the applicant intends to do and the statement itself does not confer any structural distinction between the instant invention and Horrocks. If the instant invention requires some unobvious feature that allows for the use of smaller tip-sample spacings, then applicant is invited to claim that unobvious feature and not just state that the electrode is at some distance at the unclaimed electrical double layer. If the potential measuring device requires some unobvious feature that renders it possible to monitor any potential gradient at the electrical double layer, then applicant is invited to claim that feature. Absent these or other explicitly claimed structural features that are unobvious over the structure of Horrocks,

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measuring a potential gradient at the electrical double layer does constitute the intended use of the apparatus.

23. Applicant urges that Horrock is not directed to operating in the electrical double layer. First, it is noted that the claims do not say “*in* the electrical double layer” but rather “*at* the double layer”. Being “at the electrical double layer” presumably would allow one to be some small distance above the layer and still read on “at”. Hence, the argument and claim scope clearly differ. Second, being directed to operating in a particular region still constitutes how the applicant intends to utilize the device. For the benefit of furthering prosecution, the examiner has added an alternative rejection (see above) where the examiner interprets the new limitation requiring that the tip be some distance “at the electrical double layer” as at least conferring that the apparatus needs the structural capability of bringing the tip down to some spacing that would give it the capability of being “at the electrical double layer”. However, as discussed in this alternative rejection above, the applicant has even admitted that said spacing capability was old in the art. In a preventative argument, applicant urges that Horrocks would not have been able to do so because its electrode radius is 2.5 microns. It is entirely unclear why this radius of Horrocks would have prevented Horrocks from getting close enough. What does electrode radius have to do with possible tip-sample spacing?

24. Applicant also urges that Horrocks is drawn to an ammonium-selective microelectrode. This may be the case, but the claims do not read away from the use of such an electrode.

25. With respect to the arguments concerning the new claims 37-42, these arguments are moot in view of the new grounds of rejection above.

Conclusion

26. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP §.706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kaj Olsen whose telephone number is (571) 272-1344. The examiner can normally be reached on Monday through Thursday from 5:30 A.M. to 3:00 P.M. and on alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen, can be reached on 571-272-1342. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished

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applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

AU 1753
March 18, 2005



KAJ K. OLSEN
PRIMARY EXAMINER